Physics 9th Practical

Reading.

1-1 Measure area of a cylinder with Vernier Callipers.

Least Count (L.C) = 0.1mm = $\frac{0.1}{10}$ = 0.01cm

Zero Error = Nill

Zero Correction = Nill.

Three Readings

No. of Obs.	Mean Scale reading (M) (cm)	No. of vernier division (n)	X = n x L.C (cm)	Diameter Y = M + X (cm)
1	0.6	5	0.05	0.65
2	0.5	4	0.04	0.54
3	0.6	3	0.03	0.63.

Mean diameter $= \frac{0.65 + 0.54 + 0.63}{3} = 0.61$ cm.

$r = D/2 = 0.61/2 = 0.305$ cm.

Area (A) $= \pi r^2$

$= 3.14(0.305)^2 = 0.29$ cm^2.

Marks distribution:

1- Least Count = (2)

2- Zero Error + Zero Correction = (2)

3- Diameter + Mean diameter = (4)

4. Area = (4)

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Total Marks: 12

1.2 Measure volume of cylinder using vernier calliper:

Least Count: L.C = 0.1mm = 0.01cm

Three Readings

Zero Error = Nill

Zero correction = Nill.

No. of obs.	Main Scale Reading (A) (cm)	Vernier Scale Reading (B)	C = B x L.C (cm)	D = A+C (cm)
	Length			
1	2.5	2	0.02	2.52
2	2.5	3	0.03	2.53
3	2.6	3	0.03	2.63
	Diameter			
1	0.5	5	0.05	0.55
2	0.6	4	0.04	0.64
3	0.5	5	0.05	0.55

Mean length = $l = \frac{2.52 + 2.53 + 2.63}{3} = 2.56$ cm.

Mean Diameter = $D = \frac{0.55 + 0.64 + 0.55}{3} = 0.58$ cm.

$r = D/2 = 0.58/2 = 0.29$ cm.

$V = \pi r^2 l = (3.14)(0.29)^2(2.56) = 0.676\ cm^3$.

Marks distribution:

1. Least Count = (2)
2. Zero error, Zero Correction = (2)
3. Length + Mean = (3)
4. Diameter + Mean = (3)
5. Volume = (2)

Total Marks : 12

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1·3 Measure thickness of wire using Screw gauge.

Least count (L·C) = 0·01 mm

Zero Error = Nill

Zero Correction = Nill.

Three Readings

No of obs.	Main Scale Reading (A) (mm)	Circular Scale Reading (B)	C = B×L·C (mm)	D = A+C (mm)
1	5	40	0·40	5·40
2	6	41	0·41	6·41
3	5	40	0·40	5·40.

$$\text{Mean thickness} = \frac{5{\cdot}40 + 6{\cdot}41 + 5{\cdot}40}{3}$$

$$= 5{\cdot}74\,\text{mm}.$$

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Marks distribution:

1. Least Count = (2)
2. Zero error + Zero correction = (2)
3. Three readings of thickness = (4)
4. Mean thickness + Unit = (4)

Total Marks: 12

Q·1 Acceleration of ball rolling down an angle iron by drawing graph between 2S and t^2.

Four Readings

No of Obs.	Distance (S) (cm)	Time taken t_1 (s)	t_2 (s)	Average Time $t = \frac{t_1+t_2}{2}$	2S (cm)	t^2 (sec)^2
1	120	3·0	3·0	3·0	240	9
2	140	3·6	3·6	3·6	280	13
3	160	4·1	4·1	4·1	320	17
4	180	4·6	4·6	4·6	360	21·2
5	200	5·0	5·0	5	400	25

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Marks distribution:

1- Measuring Distance = (2)
2- Measuring time t_1, t_2 = (4)
3- Plotting graph = (3)
4- Finding Slope /Acceleration = (3)

Total Marks: 12

Experiment No. Exp No. Date:

Scale:-

Along x-axis = 1 big square = 50 cm

1 Small square = 5 cm

Along y-axis = 1 big square = 5 sec²

1 Small square = 0.5 sec²

$21 - 13 = 8\ sec^2$

$360 - 280 = 80\ cm$

$Slope = \frac{8\ sec^2}{80\ cm}$

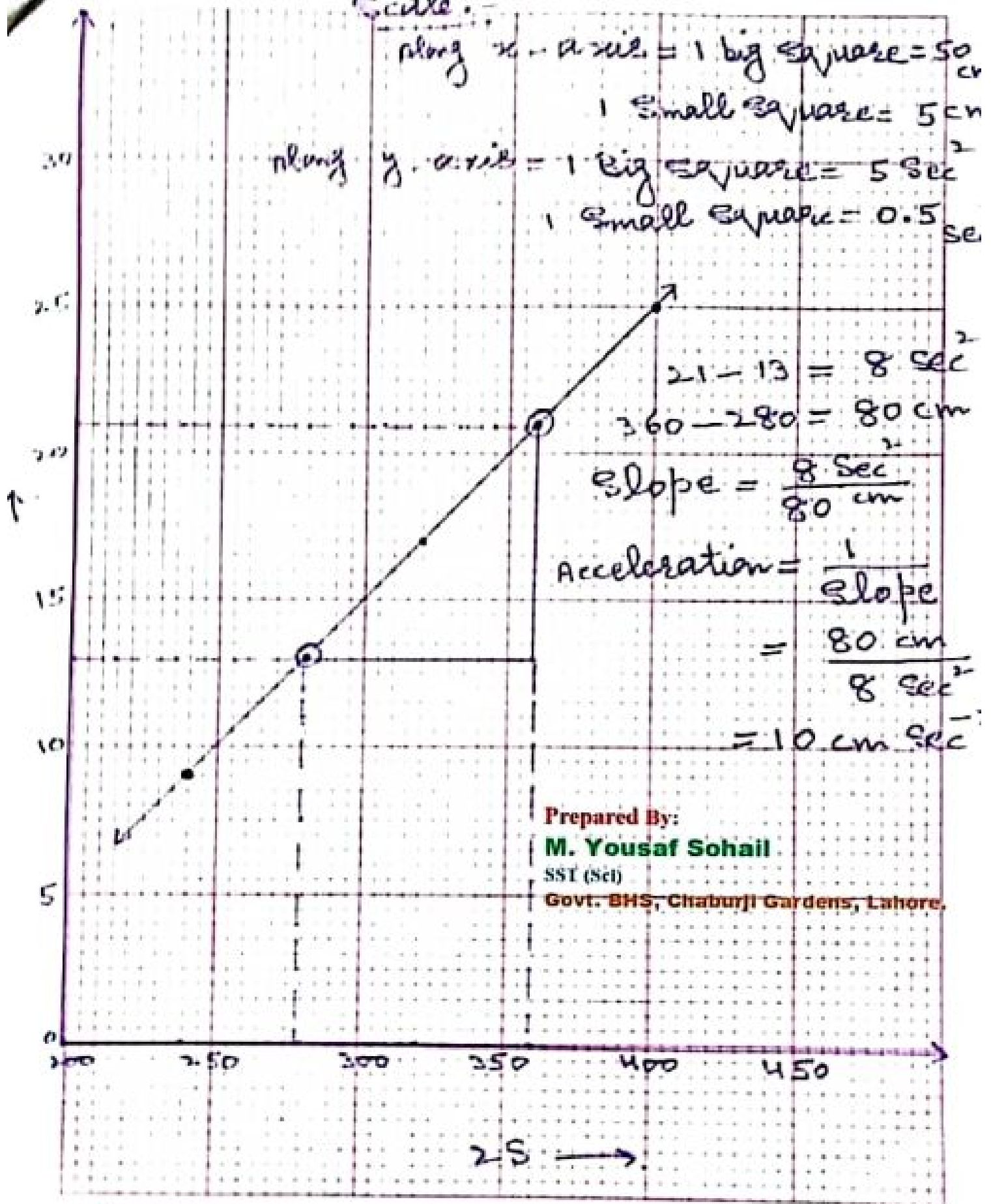
$Acceleration = \frac{1}{Slope}$

$= \frac{80\ cm}{8\ sec^2}$

$= 10\ cm\ sec^{-2}$

30, 25, 20, 15, 10, 5, 0

200, 250, 300, 350, 400, 450

2S →

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Signature:

2.2 Value of 'g' by free fall method.

Three Readings

No. of Obs.	Initial Position (h_1) (cm)	Position of Black Mark (h_2) (cm)	Height $h = h_2 - h_1$ (cm)
1	5	85	80
2	4	85	81
3	5	84	79

Mean height $= h = \frac{80+81+79}{3} = 80cm.$

Time for 10 vibration.

i- 16.16 sec ii- 16.08 sec iii- 16.02 cm.

Mean time $= t_0 = \frac{16.16+16.08+16.02}{3} = 16.09\ sec.$

Time period $= T = t_0/10 = 16.09/10 = 1.6\ sec.$

$g = 32h/T^2$ $t = T/4 = 1.6/4 = 0.4\ sec.$

$= \frac{32 \times 80}{(1.6)^2} = 1000 cm\ sec^{-2}$ **OR.** $g = \frac{2h}{t^2} = \frac{2(80)}{(0.4)^2} = 1000\ cms^{-2}$

$g = 1000/100 = 10m sec^{-2}$ $g = 10ms^{-2}$

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Marks distribution:

1- Measuring distance = (2)
2. Measuring time + Mean time = (4)
3- Measuring time period = (3)
4. Calculation of g with unit = (3)

Total Marks: 12

3.1 Coefficient of Sliding Friction.

Weight of the Pan = W_3 = 10gm = 10/100 N = 0.1 N.

Three Readings

No. of Obs.	Weight of Block (w_1) (N)	Weight placed on block (w_2) (N)	$R = w_1 + w_2$ (N)	Weight in Pan (w_4) (N)	$f_s = w_3 + w_4$ (N)	$\mu = f_s / R$
1	55gm = 55/100 N = 0.55N	50gm = 50/100 0.5N	0.55 + 0.5 = 1.05N	35 gm = 35/100 = 0.35N	0.1+0.35 = 0.45N	0.45/1.05 = 0.43
2	0.55N	0.55N	1.1N	40gm = 0.4N	0.5N	0.45
3	0.55N	0.6N	1.15N	40gm = 0.4N	0.5N	0.43

Mean $\mu = \frac{0.43 + 0.45 + 0.43}{3} = 0.44$

→ Value of Coefficient of friction between wood & wood is from 0.2 to 0.6.

Marks distribution:

1- Performance & Observations = (8)
2- Measuring μ = (4)

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Total Marks: 12

3.2 Force of Limiting friction.

$g = 9.8\,ms^{-2}$

Three Readings

Mass of Pan = m_1 = 10gm = 10/1000 Kg = 0.01Kg

Weight of Pan = $m_1 g$ = 0.01Kg × 9.8 ms^{-2} = 0.098N.

No. of Obs.	Weight Placed in Pan $m_2 g$ (N)	Limiting Friction = $m_1 g + m_2 g$ (N)
1	0.147	0.245
2	0.137	0.235
3	0.127	0.225

$$\text{Average} = \frac{0.245 + 0.235 + 0.225}{3} = 0.235\,N.$$

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Marks distribution:

1. Weight of Pan = (2)
2. Weight Placed in Pan = (3)
3. Limiting friction = (3)
4. Average = (4)

Total Marks: 12

3.3 Value of 'g' by Atwood machine.

Weight of mass 'm' from the ground = h = 100 cm = 1 m.

Three Readings

No. of Obs.	Large mass (m_1) (g)	Small mass (m_2) (g)	Time of fall of m_1 t_1 (s)	t_2 (s)	Average time $t = \frac{t_1+t_2}{2}$	$a = \frac{2h}{t^2}$ (ms^{-2})	$g = \frac{(m_1+m_2)}{(m_1-m_2)}$ (ms^{-2})
1	150	140	2.4	2.4	2.4	0.35	10.15
2	160	150	2.5	2.5	2.5	0.32	9.92
3	170	160	2.6	2.6	2.6	0.30	9.9

$$\text{Average value of 'g'} = \frac{10.15 + 9.92 + 9.9}{3} = 9.9 \text{ m/s}^2.$$

Marks distribution:

1. Taking masses m_1 & m_2 = (2)
2. Measuring Time of fall for 'm_1'. = (2)
3. Measuring 'a' = (3)
4. Measuring 'g' = (3)
5. Average value of 'g' = (2)

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Total Marks: 12

4.3 Verify Principle of Moment.

Three Readings

Position of Center of Gravity of meter rule = 0.50cm.

No. of Obs.	w_1 (N)	w_2 (N)	w_3 (N)	Position A (cm)	B (cm)	C (cm)	OA (cm)	OB (cm)	OC (cm)	Clockwise moment $T_1 = w_1 \times OA$ (Ncm)	Anti-clockwise moment $T_2 = w_2 \times OB + w_3 \times OC$ (Ncm)	Diff. $T_1 - T_2$
1	5	2	1	70	20	10	20	30	40	100	100	0
2	5	2	1	70	20	10	20	30	40	100	100	0
3	5	2	1	70	20	10	20	30	40	100	100	0

$m_1 = 500g$

$W_1 = mg$

$W_1 = \frac{500}{1000} \times 10$

$w_1 = 5 Kgms^{-2}$

$w_1 = 5N$

Marks distribution:

1- Finding center of gravity = (2)
2- Suspending weight & Balancing = (3)
3- Measuring distance clockwise = (3)
4- Anticlockwise moment = (4)

Total Marks = 12

4.4 Find unknown weight by using Principle of Moment.

Two Readings

Center of gravity of meter rule = O = 50cm

Known weight = W_2 = 500gm = 500/1000 × 10 = 5 N

Unknown Weight = W_1 = 750gm = 750/1000 × 10 = 7.5N.

No of Obs	Position of		Distance of 'w_1' from 'O' (a)	Distance of 'w_2' from 'O' (b)	$w_1 \times a = w_2 \times b$ Unknown Weight $w_1 = \frac{w_2 \times b}{a}$
	w_1 (A)	w_2 (B)			
	(cm)	(cm)	(cm)	(cm)	(N)
1	30	80	20	30	7.5
2	30	80	20	30	7.5

Average = $w_1 = \frac{7.5+7.5}{2} = 7.5N.$

Marks distribution:

1- Finding center of Gravity = ②
2- Weight of Known and Unknown = ②
3- Suspending known & unknown weights & balancing = ②
4- Measuring distance = ③
5- Finding unknown weight. = ③

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Total Marks: 12

5.1 Effect of length of Pendulum on Time Period & find 'g'.

Least Count of Vernier Calliper = 0.01cm

Two Readings

Zero Error = Nill

Zero Correction = Nill

Diameter of bob = D = 2.06cm.

Radius of bob = r = D/2 = 2.06/2 = 1.03cm.

No. of Obs.	Length of string including hook l_1 (cm)	Total length of pendulum $l = l_1 + r$ (cm)	Time for 20 oscillation t_1 (sec)	t_2 (sec)	$t = \frac{t_1+t_2}{2}$ (sec)	Time Period $T = t/20$ (sec)	T^2 sec^2	$\frac{l}{T^2}$ cms^{-2}	$g = 4\pi^2 \frac{l}{T^2}$ cms^{-2}
1	98.97	100	40	40	40	2	4	25	985.96
2	88.97	90	38	38	38	1.9	3.61	24.93	983.20
3	78.97	80	36	36	36	1.8	3.24	24.69	973.73

Mean value of g = $\frac{985.96 + 983.20 + 973.73}{3}$ = 980.96 cms^{-2}

g = 980.96/100 = 9.8 m/s^2.

Marks distribution:

1- Measuring diameter & radius = (2)
2- Measuring lengths = (2)
3- Time for 20 vib. & mean time = (3)
4- Time Period = (2)
5- Calculating 'g' = (3)

Total Marks: 12

5.2 Time Period is independent of mass of Pendulum.

Least Count of vernier Callipers = 0.01cm **Three Readings**

Zero error = Nill

Zero correction = Nill

First bob	Second Bob	Third Bob
$D_1 = 1.18cm$	$D_2 = 1.5$ cm	$D_3 = 2cm$
$r_1 = 0.59cm$	$r_2 = 0.75cm$	$r_3 = 1cm$
$l = l_1 + r_1$	$l = l_2 + r_2$	$l = l_3 + r_3$
$l = 49.41 + 0.59$	$l = 49.25 + 0.75$	$l = 49 + 1$
$l = 50cm$	$l = 50cm$	$l = 50$ cm.

No of obs.	Mass of bob(m) (gm)	Time for 20 oscillation			Time Period
		t_1 (sec)	t_2 (sec)	$t = \frac{t_1+t_2}{2}$ (sec)	$T = t/20$ (sec)
1	30	28	28	28	1.4
2	50	28	28	28	1.4
3	70	28	28	28	1.4

Average time Period = $\frac{1.4+1.4+1.4}{3}$ = 1.4sec.

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Marks distribution:

1. Diameter & radius of each bob = (3)
2. Measuring length of each bob = (2)
3. Time for 20 vib. & mean time = (4)
4. Time Period (T) & Average = (3)

Total Marks: 12

5.3 Time Period is independent of Amplitude:

Least Count of Vernier Callipers = 0.01cm

Zero error = Nill

Zero Correction = Nill

Three Readings

Diameter of bob = D = 2cm

Radius of bob = r = D/2 = 1cm

Length of Pendulum = $l = l_1 + r$ = 49 + 1 = 50cm.

No. of Obs.	Amplitude (cm)	Time for 20 oscillation t_1 (sec)	t_2 (sec)	$t = \frac{t_1+t_2}{2}$ (sec)	Time Period $T = t/20$ (sec)
1	10	28	28	28	1.4
2	15	28	28	28	1.4
3	20	28	28	28	1.4

Average time period = $\frac{1.4+1.4+1.4}{3}$ = 1.4 sec.

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Marks distribution:

1- Diameter & Radius of Bob = (2)

2- Measuring length of Pendulum = (2)

3- Time for 20 vib. + Mean time = (4)

4- Time Period & Average = (4)

Total Marks : 12

5·3 Time Period is independent of Amplitude:

Three Readings

Least Count of Vernier Callipers = 0·01cm

Zero error = Nill

Zero Correction = Nill

Diameter of bob = D = 2cm

Radius of bob = r = D/2 = 1cm

Length of Pendulum = $l = l_1 + r$ = 49 + 1 = 50cm.

No. of Obs.	Amplitude (cm)	Time for 20 oscillation t_1 (sec)	t_2 (sec)	$t = \frac{t_1+t_2}{2}$ (sec)	Time Period T = t/20 (sec)
1	10	28	28	28	1·4
2	15	28	28	28	1·4
3	20	28	28	28	1·4

Average time period = $\frac{1·4+1·4+1·4}{3}$ = 1·4 sec.

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Marks distribution:

1- Diameter & Radius of Bob = (2)
2- Measuring length of Pendulum = (2)
3- Time for 20 vib. + Mean time = (4)
4- Time Period & Average = (4)

Total Marks : 12

7·1 Relation between Load and Extension (Helical spring).

Four Readings.

Initial Position of pointer $= P_0 = 0$ cm.

No. of obs.	Total mass in hanger m (gm)	Load F=mg (N) 100gm=1N	Position of Pointer Loading P_1 (cm)	Unloading P_2 (cm)	Mean $P = \frac{P_1+P_2}{2}$ (cm)	Extension $X = P - P_0$ (cm)
1	50	$\frac{50}{1000}$ N $= 0.5$	1.5	1.5	1.5	1.5
2	100	1.0	3.0	3.0	3.0	3.0
3	150	1.5	4.5	4.5	4.5	4.5
4	200	2.0	6.0	6.0	6.0	6.0
5	250	2.5	7.5	7.5	7.5	7.5

Marks distribution:

1- Apparatus Setting = (2)
2- Taking four Reading = (5)
3- Plotting graph = (5)

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Total Marks: 12

Along x-axis
2 Big square = 0.5 N
Along y-axis
2 Big square = 1.5 cm
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Extension
9
7.5
6
4.5
3
1.5
0
0.5
1.5
2
2.5
3
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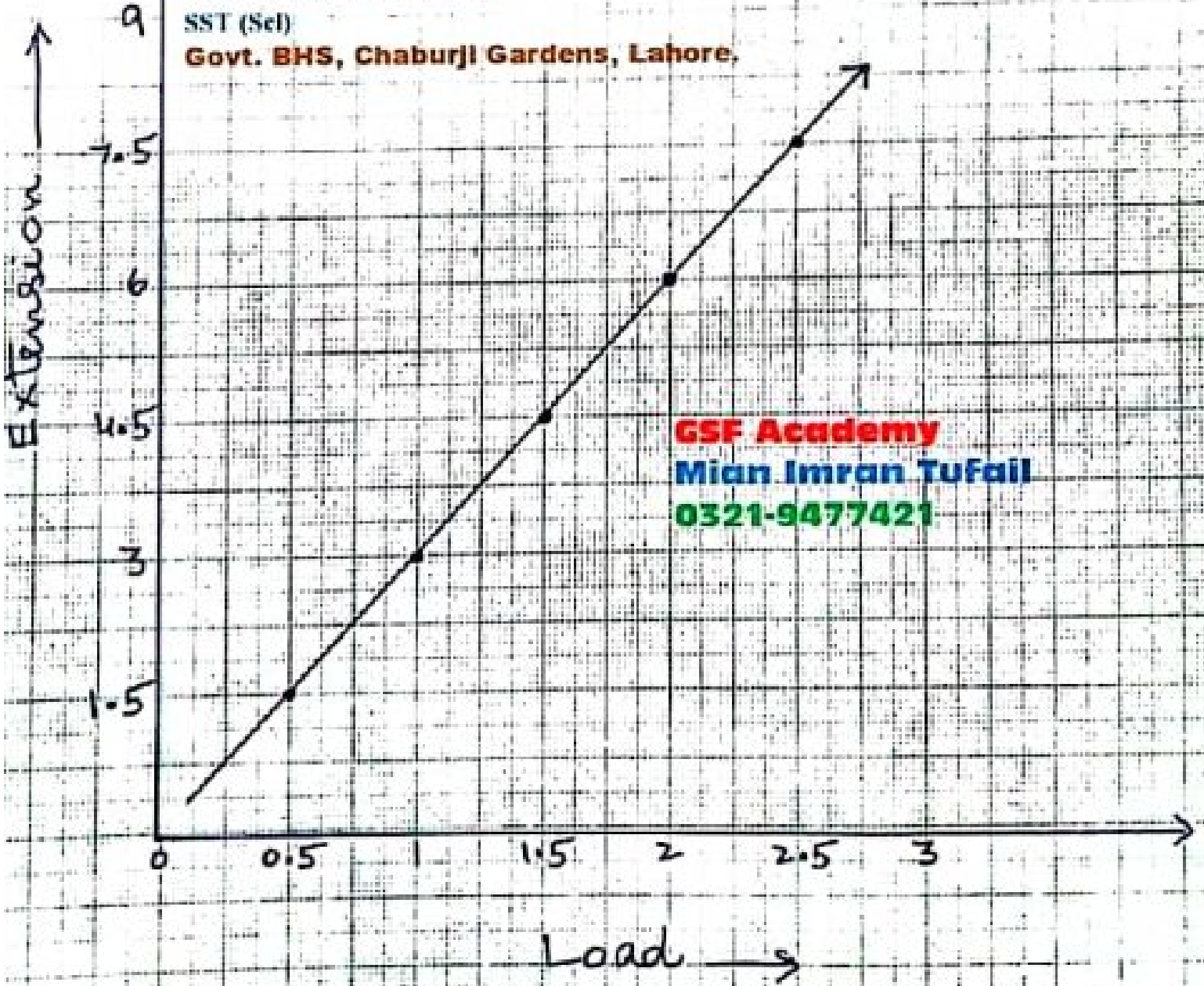
7.2 Density of an object heavier than water by Archmedes principle.

Room temperature = 28°C

Mass of object in air = m_1 = 32g = 32/1000 Kg = 0.032 g

Weight of object in air = $W_1 = m_1 g$

= 0.032 Kg × 10 m/s²

= 0.32N.

Mass of object in water = m_2 = 20g = 20/1000 Kg = 0.02 Kg.

weight of object in water = $W_2 = m_2 g$

= 0.02 × 10 Kg m/s²

= 0.2N

Decrease in weight = $W_1 - W_2$ = 0.32 − 0.2 = 0.12 N

Density of water = 1000 Kg m⁻³

Density of object = Density of water × $\frac{W_1}{W_1 - W_2}$

= $\frac{1000 \times 0.32}{0.12}$ = 2667 Kgm⁻³.

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Marks distribution:

1- Weight of object in Air = (2)
2- Weight of object in water = (2)
3- Decrease in weight = (4)
4- Finding density of object = (4)

Total Marks : 12

7·3 Density of liquid by syringe.

Three Readings

Room temperature = 30°C

Mass of empty syringe = m_1 = 5 gm.

No. of Obs.	Volume of liquid 'V' (cm^3 = ml)	Mass of syringe with liquid 'm_2' (gm)	Mass of liquid $m = m_2 - m_1$ (gm)	Density = m/V (gcm^{-3})
1	5	10	10-5=5	5/5 = 1
2	4	9	9-5 = 4	4/4 = 1
3	3	8	8-5 = 3	3/3 = 1

Average density $= \frac{1+1+1}{3} = 1\ gcm^{-3}$.

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Marks distribution:

1- Mass of empty syringe = (2)
2- Volume of liquid = (2)
3- Mass of syringe with liquid = (2)
4- Mass of liquid = (2)
5- Find density = (2)
6- Average density with unit = (2)

Total Marks : 12

Physics 10th Practical

Reading.

12.1 Verify Law of refraction using a glass slab.

Two readings

N
i
r
N

m∠i > m∠r

No. of obs.	∠i	Sin∠i	∠r	Sin∠r	$n = \frac{\sin\angle i}{\sin\angle r}$
1	30°	0.5	20°	0.34	1.47
2	40°	0.64	25°	0.42	1.52
3	50°	0.77	30°	0.5	1.54

Mean refractive index of glass $= \frac{1.47 + 1.52 + 1.54}{3}$

$= \frac{4.53}{3} = 1.51.$

Marks distribution:

1- Boundary = (2)

2- Drawing rays with arrows = (2)

3- Measure ∠i, ∠r = (3)

4- Find n = (3)

5- Mean of n = (2)

Total Marks: 12

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12.2 Refractive Index of Water Using Concave mirror.

$h_1 > h_2$ — Two readings

Approximate focal length = 10 cm.

No. of obs.	Distance b/w needle and mirror h_1 (cm)	Distance b/w needle and water surface h_2 (cm)	Refractive Index $n = \frac{h_1}{h_2}$
1	30	23	1.30
2	31	24	1.29
3	32	24	1.33

Mean refractive index of water $= \frac{1.30 + 1.29 + 1.33}{3}$

$= \frac{3.92}{3} = 1.31.$

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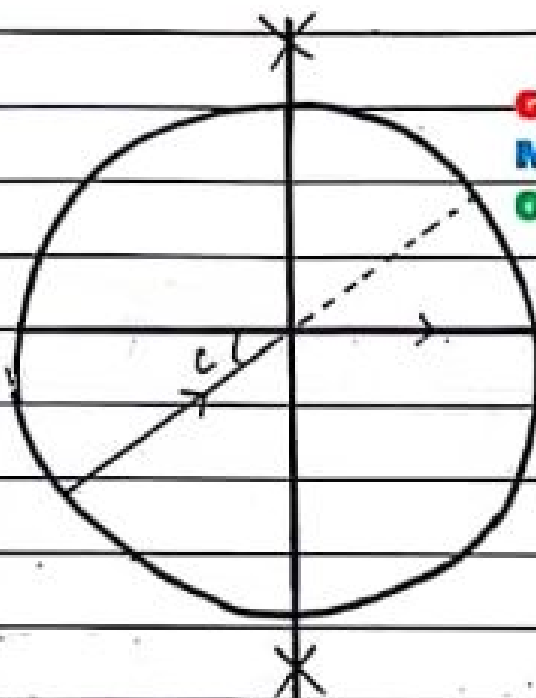
Marks distribution:

1. Approximate focal length = ②
2. Removing Parallex = ②
3. Removing Parallex after adding water = ②
4. Measuring distance = ③
5. Finding n = ③

Total Marks : 12

12·3 Determine Critical angle of glass using semi-circular slab.

$\angle c \approx 40^\circ$

Two readings

GSF Academy
Mian Imran Tufail
0321-9477421

No of obs.	Critical Angle (c)
1	40°
2	42°

$$\text{Mean} = \frac{40+42}{2}$$

$$= \frac{82}{2} = 41^\circ$$

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Marks distribution:

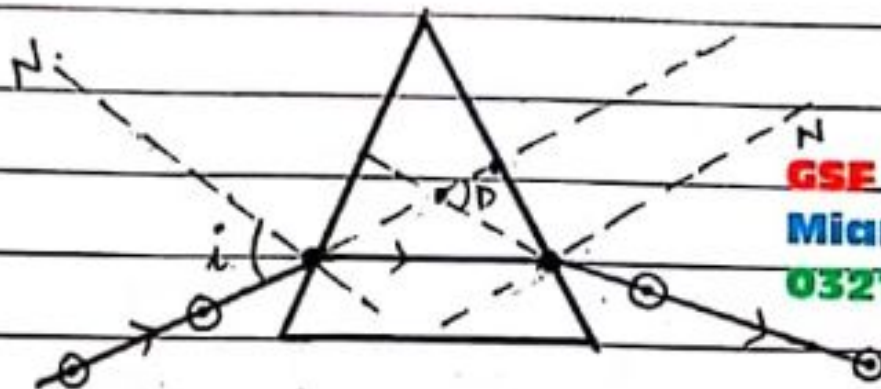
1. Apparatus setting = ③
2. Performance and geometry = ③
3. Finding ∠c = ④
4. Mean critical angle = ②

Total Marks: 12

12·4 Path of ray of light using prism & measure angle of deviation.

m∠i > m∠D

Two readings

N, i, D, N

No. of obs.	Angle of Incidence ∠i	Angle of Deviation ∠D
1	60°	40°
2	70°	30°
3	80°	20° or 25°

Marks distribution:

1. Boundary of prism = (2)
2. Drawing rays with arrows = (3)
3. Completion of geometry = (3)
4. Measure ∠i, ∠D = (4)

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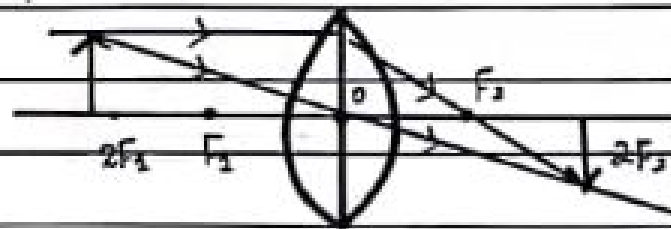
Total Marks: 12

12.5 Focal length of convex lens by Parallex method.

Two Readings

- Object at $2F_1$, Image is at $2F_2$, Real, Inverted, Same size.

OR

- Object is beyond $2F_1$, Image is at $2F_2$. Real, Inverted, Small Size.

Approximate focal length = f = 10cm.

No. of Obs.	Object Needle 'O' (cm)	Position of lens 'L' (cm)	Position of Image Needle 'I' (cm)	'p' (L-O) (cm)	'q' (I-L) (cm)	focal length $f = \frac{pq}{p+q}$
1	27	50	69	50-27= 23	69-50= 19	10.40
2	28	50	70	22	20	10.47
3	29	50	71	21	21	10.50

Mean focal length = 10.46 cm.

Marks distribution:

1- Approximate focal length = (2)
2- Ray Diagram = (2)
3- Finding 'p' & 'q' = (3)
4- Calculate 'f' = (3)
5- Mean 'f' = (2)

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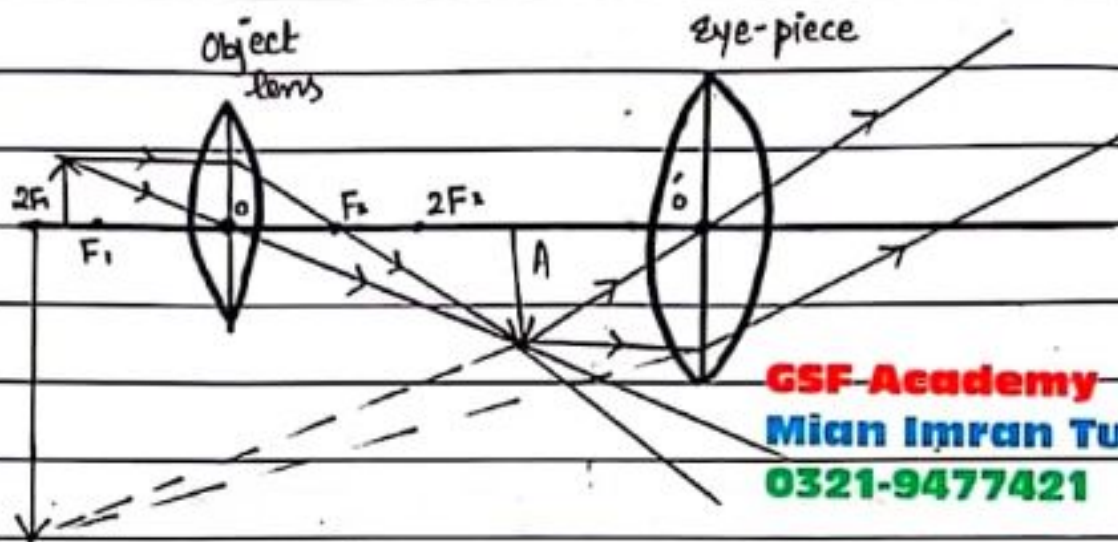
Total Marks: 12

12·6(a) Set up a microscope.

- $2F_1 = F_1 = O = F_2 = 2F_2 = 1cm$
- $O = 2cm + 2cm$.
- Between $2F_1$ & F_1 = 1cm
- Image beyond $2F_2$
- Real, Inverted, Magnified
- $OA = AO' = 3cm$
- $O' = 3cm + 3cm$
- Image at $2F_1$
- Virtual, Inverted, Magnified.
- Approximate focal length of object lens = 10cm
- Approximate focal length of eyepiece = 20cm.

Marks distribution:

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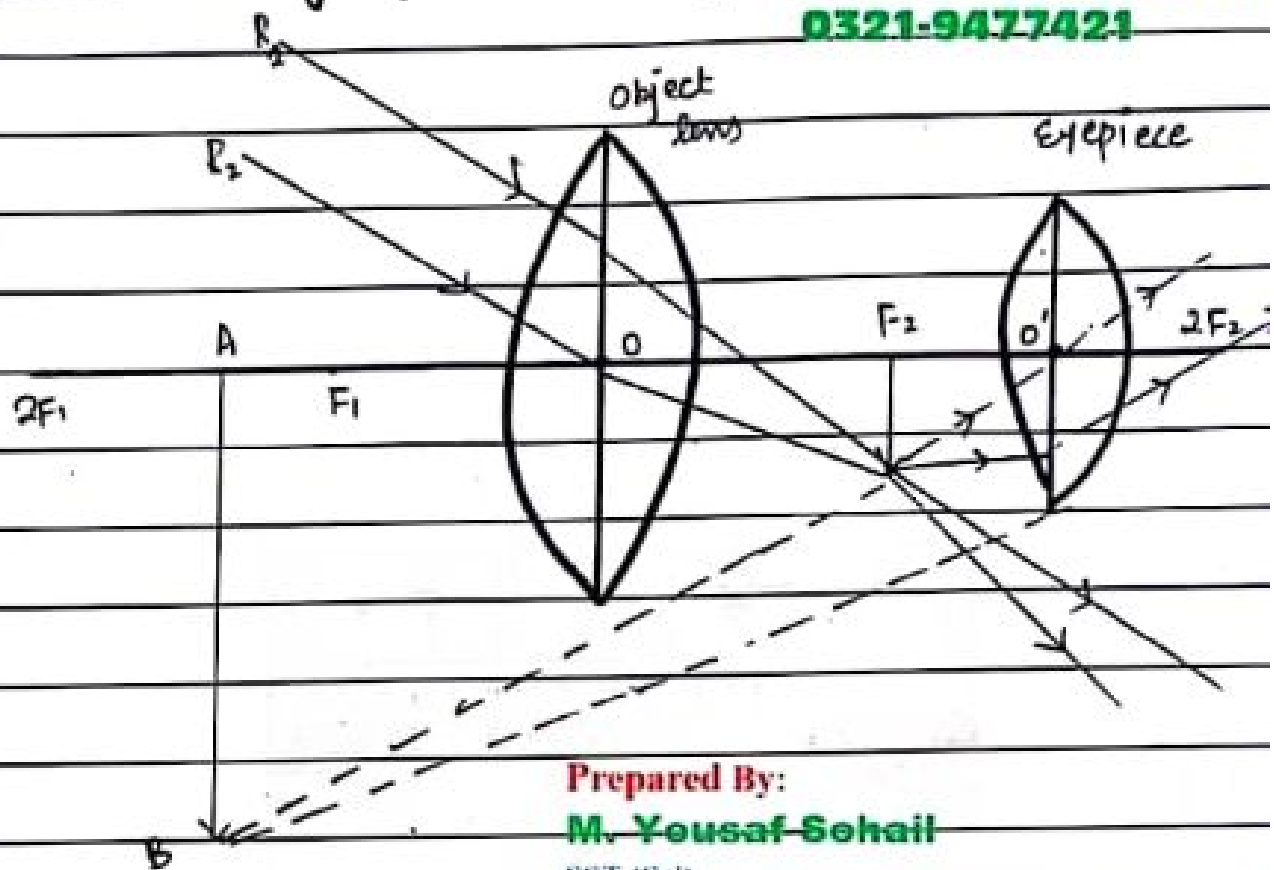
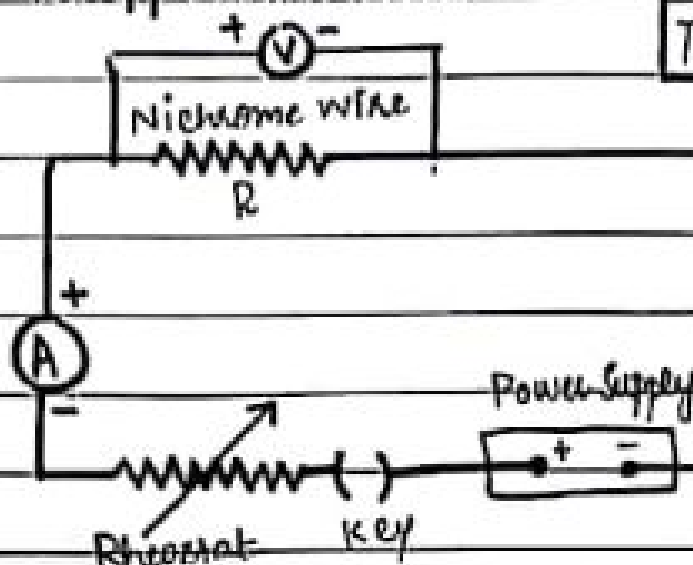
1. Ray diagram = (2)
2. Focal length of eyepiece & Object lens = (2)
3. Apparatus Setting = (3)
4. Removing parallex = (2)
5. Adjust eyepiece & getting magnified image = (3)

Total Marks: 12

12.6(b) Setting up a Telescope.
GSF Academy
Mian Imran Tufail
0321-9477421
R1
R2
Object lens
Eyepiece
A
2F1
F1
O
F2
O'
2F2
B
Prepared By:
M. Yousaf Sohail
SST (Sci)
Govt. BHS, Chaburji Gardens, Lahore.
• 2F1 - F1 = O = F2 = 2F2 = 4cm
• O = 3cm
• R1 & R2 are parallel
• Image at F2
• AB = 8cm
• O' = 2cm.
→ Approximate focal length of eyepiece = 10cm.
→ Approximate focal length of object lens = 20cm.
Marks distribution:
GSF Academy
Mian Imran Tufail
0321-9477421
1. Ray diagram = 2
2. Approximate focal length of eyepiece & Object lens = 2
3. Apparatus Setting = 3
4. Removing Parallex = 2
5. Adjust eye piece & get Inverted Image (AB) = 3
Total Marks: 12
Scanned with CamScanner

14.1 Verify Ohm law.

Three readings

- Nichrome wire is a mixture of Nickle, Iron & Copper.

No of Obs.	Voltmeter Reading 'V' (Volt)	Ammeter Reading 'I' (Amp)	$R = \frac{V}{I}$ (Ω)
1	2.0	0.1	20
2	3.0	0.15	20
3	4.0	0.2	20.

Mean resistance $= \frac{20+20+20}{3} = \frac{60}{3} = 20\,\Omega$.

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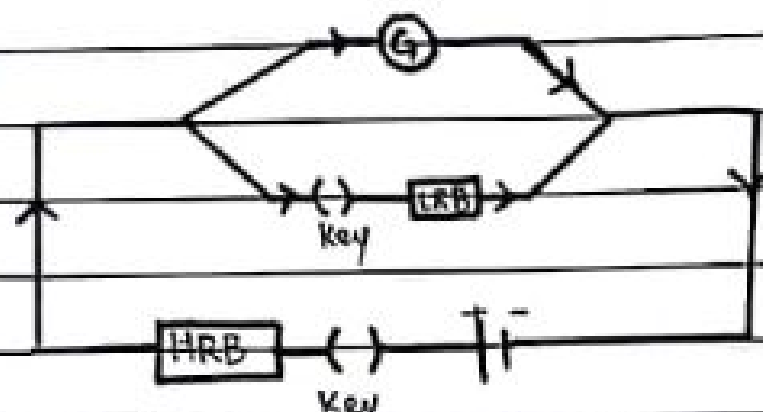
Marks distribution:

1. Circuit diagram = (2)
2. Three voltmeter Reading = (3)
3. Three Ammeter Reading = (3)
4. Finding R = (2)
5. Mean R = (2)

Total Marks: 12

14.4 Resistance of Galvanometer by half deflection method.

Three Readings

G
LRB
Key
HRB
Key

No. of Obs.	High Resistance 'R' (Ω)	Deflection 'θ' (Div)	Shunt Resistance 'Rs' (Ω)	Deflection θ/2 (Div)	Resistance of Galvanometer $R_G = R_s$ (Ω)
1	2022	28	100	14	100
2	3500	24	100	12	100
3	4000	20	100	10	100

Mean Resistance $= \frac{100+100+100}{3} = \frac{300}{3} = 100\,\Omega$.

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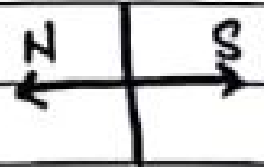
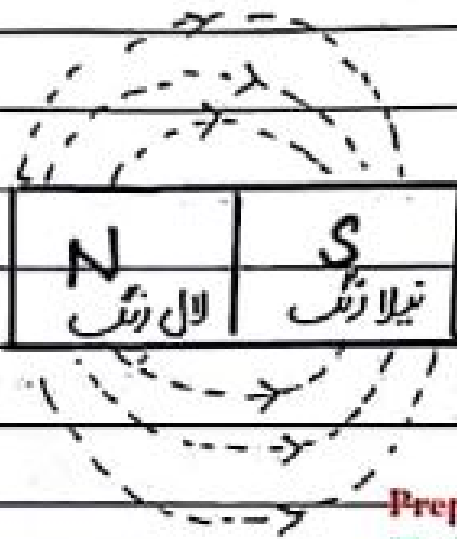
Marks distribution:

1. Circuit diagram = 2
2. Taking resistance from HRB = 3
3. Taking resistance from LRB = 3
4. Calculate R_G = 3
5. Mean R_G = 1

Total Marks : 12

15.1 Trace the magnetic field by bar magnet.

N S

N لال رنگ

S نیلا رنگ

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Marks distribution:

1. Setting of bar magnet = (2)
2. Boundary of bar magnet = (2)
3. Flotting magnetic field = (4)
4. Show lines with arrow head = (4)

Total Marks = 12

16.1(a) Study of OR Gate.

A, B, Q, V, +, -, R

A	B	Q = A+B
0	0	0
0	1	1
1	0	1
1	1	1.

Marks distribution:

1- Circuit diagram = 3
2- Performance = 3
3- Truth table = 6

Total Marks: 12

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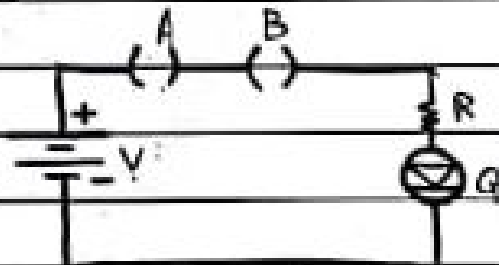
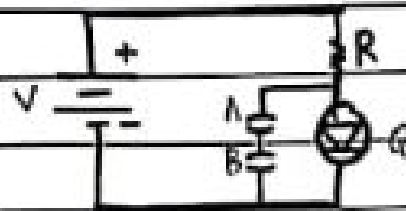
16.1(b) Study of AND Gate.

A, B, Q, V, +, -, R

A	B	Q = A·B
0	0	0
0	1	0
1	0	0
1	1	1.

Marks distribution:

1. Circuit diagram = 3
2. Performance = 3
3. Truth table = 6

Total Marks: 12

16.1(e) Study of NAND Gate.

A	B	$Q = \overline{A \cdot B}$
0	0	1
0	1	1
1	0	1
1	1	0

Marks distribution:

1- Circuit diagram : (3)
2- Performance : (3)
3- Truth table : (6)

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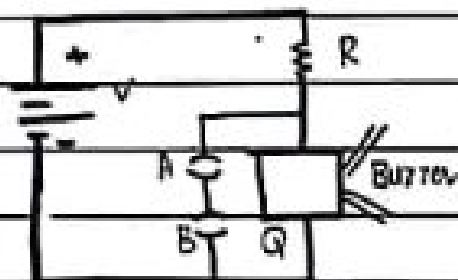
Total Marks: 12

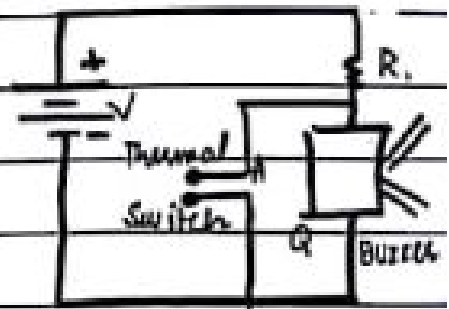
16.2(a) NAND Gate Burglar Alarm.

A	B	$Q = \overline{A \cdot B}$
0	0	1
0	1	1
1	0	1
1	1	0

Marks distribution:

1. Circuit diagram = (3)
2. Performance = (3)
3. Truth table = (6)

Total Marks : 12

16.2(b) NOT Gate Fire Alarm.

A	$Q = \bar{A}$
0	1
1	0

R.
Thermal Switch
Q
Buzzer

Marks distribution:

1- Circuit diagram = 3
2- Performance = 3
3- Truth table = 6

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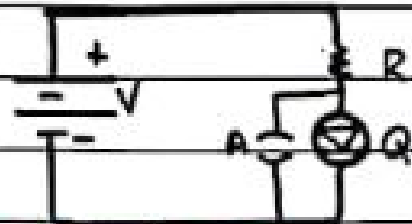
Total Marks: 12.

16·1(c) Study of NOT Gate.

A	$Q = \overline{A}$
0	1
1	0

Marks distribution:

1. Circuit diagram = 3
2. Performance = 3
3. Truth table = 6

Total Marks : 12

16·1(d) Study of NOR Gate.

A	B	$Q = \overline{A+B}$
0	0	1
0	1	0
1	0	0
1	1	0

Marks distribution:

1. Circuit diagram = 3
2. Performance = 3
3. Truth table = 6

Total Marks = 12